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THESIS

**COMPARISON OF THE NAVY WORKING
CAPITAL FUND AND MISSION FUNDING
AS APPLIED TO NAVY SHIPYARDS**

by

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June 2006

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CAPITAL FUND AND MISSION FUNDING
AS APPLIED TO NAVY SHIPYARDS**

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ABSTRACT

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LIST OF ACRONYMS

3M	Maintenance and Material Management
2M	Miniature and Micro-Miniature
APN	Aircraft Procurement Navy
ABC	Activity Based Costing
AOR	Accumulated Operating Result
AOB	Annual Operating Budget
ASN (FM&C)	Assistant Secretary of the Navy (Financial Management and Comptroller)
BES	Budget Estimate Submission
BRAC	Base Realignment and Closure
BSO	Budget Submitting Office
BUMED	Bureau of Medicine and Surgery
CBM	Condition Based Maintenance
CBO	Congressional Budget Office
COMPACFLT	Commander Pacific Fleet
COMSUBLANT	Commander Submarine Force, U.S. Atlantic Fleet
COMSUBPAC	Commander Submarine Force, U.S. Pacific Fleet
CNI	Naval Installations Command
CNO	Chief of Naval Operations
CRA	Continuing Resolution Authority
CSMP	Current Ship's Maintenance Plan
CSMP	Consolidated Ship's Maintenance Plan
DBOF	Defense Business Operations Fund
DDMC	Defense Depot Maintenance Council
DLH	Direct Labor Hour
DoD	Department of Defense
DoN	Department of the Navy
DWCF	Defense Working Capital Fund
FAA	Fund Administrating Activity
FMA	Fleet Maintenance Activity
FMB	Office of Budget
FMR	Financial Management Regulations
FY	Fiscal Year
GAO	Government Accountability Office (formerly General Accounting Office)
IDTC	Inter-Deployment Training Cycle
IG	Inspector General
IMF	Intermediate Maintenance Facility
JCN	Job Control Number
JCS	Joint Chiefs of Staff
MCN	Military Construction Navy
MDS	Maintenance Data System

MF	Mission Funding
MILCON	Military Construction
MILPERS	Military Personnel
MIP	Maintenance Index Page
MJC	Master Job Catalog
MPN	Military Personnel Navy
MRC	Maintenance Requirement Card
MRMS	Maintenance Resource Management System
NAVFAC	Naval Engineering Facilities Command
NAVSEA	Naval Sea Systems Command
NETC	Naval Education and Training Command
NNS	Norfolk Naval Shipyard
NOR	Net Operating Result
NPC	Naval Personnel Command
NSY	Naval Shipyard
NWCF	Navy Working Capital Fund
OMN	Operation and Maintenance Navy
OMB	Office of Management and Budget
OPN	Other Procurement Navy
OPTAR	Operating Target
OSD	Office of the Secretary of Defense
PBD	Program Budget Decision
PHNS	Pearl Harbor Naval Shipyard
PMS	Preventative Maintenance Schedule
PNS	Portsmouth Naval Shipyard
POM	Program Objectives Memorandum
PPBE	Planning, Programming, Budgeting and Execution System
PSNS	Puget Sound Naval Shipyard
RCM	Reliability Centered Maintenance
RDT&E	Research, Development, Testing and Evaluation
RMC	Regional Maintenance Center
RMP	Regional Maintenance Program
SCN	Shipbuilding and Conversion Navy
SECNAV	Secretary of the Navy
SIMA	Shore Intermediate Maintenance Activity
SYMIS	Shipyard Management Information System
TRF	Trident Refit Facility
USD(C)	Under Secretary of Defense (Comptroller)
WPN	Weapons Procurement Navy

I. INTRODUCTION

The rapid change in the national defense environment during the early 1990s, a function of the collapse of the Soviet Union, resulted in widespread initiatives designed to improve the efficiency and cost effectiveness of the Department of Defense (DoD). One target of this initiative has been the Navy's shipyard maintenance structure.

In 1994, the Chief of Naval Operations introduced the Regional Maintenance Plan (RMP) for Navy shipyards, a consolidation of facilities aimed at reducing excess infrastructure, improving maintenance processes, and combining supply and maintenance functions across all levels of maintenance (GAO 1997, p.5). A byproduct of this regionalization effort has been the consolidation of the financial management systems used to govern these commands. Specifically, the Navy has shifted two of its four shipyards from a working capital method of funding to a more direct mission funding platform, and plans to restructure all of its shipyards in this fashion in the near future.

This change has raised questions about the advantages and disadvantages each funding structure provides the shipyard, the operating differences that occur due to funding changes, and the future financial consequences of mission funding.

This thesis will identify the advantages and disadvantages of the Navy Working Capital Fund (NWCF) and the Mission Funding (MF) model for Navy shipyards and determine whether the change in financial structure provides an overall benefit that should be pursued for all shipyards.

A. OBJECTIVES

This thesis examines the differences between the Navy Working Capital Fund and Mission Funding within the Navy shipyard maintenance environment. The goal of this work is to determine how these two funding methods constrain shipyard managers, as well as the aspects of each method that provide shipyard managers with opportunities unavailable under the other method.

B. SCOPE

The purpose of this research is to:

- Describe the reasons behind the Navy's shipyard restructuring plans.
- Explain the operations of both funding methods.
- Identify the inherent differences between both funding methods and show how these differences manifest themselves in Navy shipyard operations.
- Suggest which funding method best serves the Navy shipyards.

C. METHODOLOGY

In researching this topic, the following were conducted:

- A literature review of the historical background and basis behind the Navy's decision to regionalize and consolidate its shipyards, as well as the decision to favor Mission Funding over the Navy Working Capital Fund.
- Research into the Navy's maintenance organizational structure and processes.
- A literature review of the Federal budget process, from the perspective of the Navy, the Department of Defense and Congress. Additionally, a review of the budget execution process for Navy shipyards under each funding model was conducted.
- A review of government reports from the Congressional Budget Office, the Congressional Research Service, the General Accountability Office, The Center for Naval Analysis, the DoD Comptroller and the DoD Inspector General was conducted during the progress of this research. Additionally, DoD directives and DoD and DoN Financial Management Circulars and instructions were perused, as was the GAO Red Book for authorities on Fiscal Law and procedures. Standard sources on governmental accounting and periodical literature were consulted, including publications of the U. S. Naval Institute.

- A study of the performance and cost reporting requirements for organizations under each funding method and the information contained therein.
- Personal interviews with Navy Material and Logistics Offices (N4) at COMSUBPAC and COMSUBLANT were conducted to verify processes and identify how each funding method affects everyday operations, including numerous follow-up phone conversations.

D. ORGANIZATION

This thesis is organized in the following manner:

- Chapter I is the Introduction.
- Chapter II describes the Navy maintenance processes and the factors that led to the change in the Navy shipyard maintenance organizational structure.
- Chapter III describes Mission Funding regulations, budgeting and execution, restrictions and shipyard operation under this model.
- Chapter IV describes the Navy Working Capital Fund and its regulations, budgeting and execution, restrictions and shipyard operation under this model.
- Chapter V compares the two funding methods in the context of Navy shipyard operations.
- Chapter VI gives conclusions and recommendations for further study.

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II. BACKGROUND

There is wide variety of subject matter to absorb before the issues concerning a depot maintenance funding shift can be appreciated. This chapter provides an explanation of the Navy's maintenance organization, creating a foundation to apply to the structural changes that have taken place within the realm of shipyard maintenance. Second, this chapter describes the political inertia behind the changes this thesis examines and provides an introduction to the Department of Defense and Navy policies that govern how their shipyards were reorganized in the face of this transformation.

A. DEPARTMENT OF THE NAVY MAINTENANCE ORGANIZATION

The Navy's maintenance program defines and manages the required configuration of each class of ship, along with the material condition of each individual ship. This program encompasses servicing, repair, modification, modernization, overhaul, conversion, rebuild, test, reclamation inspection and the determination of material condition. Its purpose is threefold: To maintain the highest achievable level of material readiness while supporting the ship's mission and sustaining operational availability, to maintain ships in a safe material condition, and to meet the highest possible shipboard habitability standards possible for its sailors (OPNAVINST 4700.7K 2003, p.4).

Maintenance procedures and schedules for Navy ships and related equipment are developed and performed using a methodology the Navy refers to as Condition-Based Maintenance (CBM). CBM attempts to balance operational readiness, safety, and equipment reliability with cost effectiveness, by conducting maintenance only when there is objective evidence of actual or predictable failure of a ship's installed systems or components. It relies on the principles of Reliability Centered Maintenance (RCM) to obtain this balance (OPNAVINST 4700.7K 2003, p.5).

Reliability-Centered Maintenance identifies maintenance tasks that are both applicable and effective in maintaining the inherent reliability of systems or equipment at an optimal cost. RCM principles determine what constitutes objective evidence of need for maintenance, while also ensuring that a maintenance task is both applicable to the

need and effective in restoring the system. RCM-applicable methodology identifies the maintenance tasks that are able to maintain or restore system or equipment reliability. RCM-effective methodology optimizes variables such as system or equipment failure consequences, safety of personnel, environmental impact, mission capability hindrance, and minimal life cycle cost to ensure that maintenance tasks “*pay for themselves*” (OPNAVINST 4700.7K 2003, Encl 7, p.7).

1. Maintenance Echelons

As one would expect for systems and equipment as sophisticated and physically imposing as a Navy vessel, the maintenance performed to ensure mission capability consists of actions as simple as visual inspections and minor testing, as well as covering such manpower and equipment intensive evolutions as nuclear refueling. To ensure all work is performed at locations, and by personnel, best suited for proper accomplishment, OPNAV Instruction 4700.7K separates ship maintenance into three echelons: organizational, intermediate, and depot level. Each respective level provides a greater degree of capability. It is the policy of the Navy to ensure all maintenance is done at the correct echelon by qualified personnel.

a. Organizational-Level Maintenance

Organizational-level maintenance represents the lowest echelon and consists of all preventative and corrective maintenance actions within the capacity of each individual ship’s operational forces. Each ship is expected to be self-sufficient to the maximum extent possible, fostering a “*do it yourself*” attitude and maximizing the mission capability of each ship (OPNAVINST 4700.7K 2003, p.8).

Typical organizational-level maintenance actions include:

- Facilities maintenance, such as cleaning and preservation.
- Routine systems and component preventive maintenance, such as inspections, systems operability tests and diagnostics, lubrication, calibration, and cleaning.

- Corrective maintenance, such as hull, mechanical, electrical, and electronic troubleshooting down to the lowest replaceable unit level, miniature and micro-miniature (2M) electronic repair, and minor repairs to components to restore operation.
- Assistance to higher level maintenance activities.
- Verification and quality assurance of maintenance accomplished by other activities.
- Documentation of all deferred and completed maintenance actions, whether accomplished by ship's force or by other activities (OPNAVINST 4700.7K 2003, Encl 1, p.1).

b. Intermediate-Level Maintenance

Intermediate-level maintenance requires a higher skill, capability or capacity than can be supported by ship's force on an organizational level. Intermediate-level work includes the following:

- Preventive maintenance.
- Corrective maintenance.
- Tests and inspections.
- Provision of services such as electrical power, water, gas and air replenishment, and tool issue.
- Installation of alterations.
- Work on electronic miniature/ micro-miniature printed circuit boards, components, modules, subassemblies, and other equipment coded for intermediate-level repair.
- Calibration and repair services for electrical and electronic test and monitoring equipment; pressure, vacuum, and temperature measuring devices; and mechanical measuring instruments.

- Technical assistance to ship's force in diagnosing system or equipment problems and assistance in repairs, as necessary.
- Assistance in the emergency repair and manufacture of unavailable replacement parts or assemblies (OPNAVINST 4700.7K 2003, Encl 2, p.1).

This maintenance is performed primarily by Navy Fleet Maintenance Activity (FMA) personnel, and can be accomplished at Intermediate Maintenance Facilities (IMF), Shore Intermediate Maintenance Activities (SIMA), Trident Refit Facilities (TRF), tenders, repair ships, aircraft carriers and Fleet support bases. These facilities are equipped with space, machinery and diagnostic equipment not available to ship's force. Intermediate maintenance is conducted during upkeep periods, known as availabilities, which typically span about one month in duration. (Ibid)

c. Depot-Level Maintenance

Depot-level maintenance exceeds the capabilities of both organizational- and intermediate-level activities. It typically takes much longer, often twelve months or more, than intermediate availabilities. Activities performed at the Depot-level include:

- Preventative maintenance.
- Corrective maintenance.
- Test and inspections.
- Provision of services such as electrical power, water, gas and air replenishment, and tool issue.
- Installation of alterations.
- Modernization, conversion, overhaul, and reclamation or rebuild of parts, assemblies, sub-assemblies, components, equipment and weapons systems.

- Manufacture of critical non-available parts.
- Providing technical assistance to IMAs (OPNAVINST 3120.32C 1994, Encl 1, p.9-8).

This maintenance is typically conducted in fixed shore facilities, Navy shipyards (NSY), private shipyards and by depot field teams. There are four NSYs designated for depot-level maintenance: Norfolk Naval Shipyard (NNS) and Portsmouth Naval Shipyard (PNS) which serve the Atlantic Fleet, and Pearl Harbor Naval Shipyard (PHNS) and Puget Sound Naval Shipyard (PSNS) which serve the Pacific Fleet. Additionally, six private shipyards also provide depot-level capability, as well as performing all new ship construction: Avondale Operation (New Orleans, Louisiana), Ingalls Operation (Gulfport, Mississippi), Newport News Shipyard (Newport News, Virginia), Bath Iron Works (Bath, Maine), Electric Boat (Groton, Connecticut) and the National Steel and Shipbuilding Company (San Diego, California). Avondale, Ingalls and Newport News are owned by Northrup Grumman Ship Systems, while Bath Iron Works, Electric Boat and the National Steel and Shipbuilding Company are owned by General Dynamics.

2. Maintenance Policy and Procedures

The Navy requires each class of ship to adhere to its own specific maintenance program. Each program delineates all preventive maintenance actions for all maintenance echelons, including their required periodicities. To improve the readiness capability of each ship, each maintenance program also coordinates evolutions requiring significant time in port, such as depot-level availabilities, with the ships' Inter-Deployment Training Cycle (IDTC) schedule. It includes the required frequency of intermediate-level availabilities, as well as any special maintenance, maintenance support, or infrastructure requirements. Each program is approved through the applicable CNO Ship's Resource Sponsor for that class of ship, and is developed and executed by the Naval Sea Systems Command (NAVSEASYS) (OPNAVINST 4700.7K 2003, p.7).

The management of maintenance and maintenance support is governed by the Navy Ships' Maintenance and Material Management System (3-M). The 3-M System provides managers with the ability to access standardized data to aid in planning and controlling manpower and resources requirements in conducting preventative and corrective maintenance, as well as a channel to provide feedback and evaluation of procedures and resource requirements. It is designed to optimize the performance of current and future maintenance efforts by requiring uniform maintenance standards and criteria, documenting and analyzing maintenance and maintenance support actions, and providing a means to schedule, plan, manage and track maintenance actions. To further improve efficiency in accurately maintaining the status of all ships, the 3-M System is separated into two categories, preventative maintenance and corrective maintenance (OPNAVINST 4790.4D 2004, p.2).

a. Preventative Maintenance

Preventive maintenance actions are defined as those actions intended to prevent or discover functional failures (OPNAVINST 4700.7K 2003, Encl 7, p.7). These maintenance items are designed to prevent costly corrective repairs by preemptively performing minor tests and inspections designed to restore optimal operation and to discover parts in need of replacement prior to failure. Preventative maintenance is controlled by the Planned Maintenance System (PMS), a subset of the 3-M System that provides a standard means for planning, scheduling, controlling, and performing planned maintenance on all equipment (OPNAVINST 3120.32C 1994, Encl 1 p.9-3). The PMS System is divided into two levels, organizational and intermediate/ depot-level.

(1) Organizational Level Preventative Maintenance. All non-nuclear¹ organizational-level PMS actions are contained on Maintenance Requirement Cards (MRC). MRCs provide detailed procedures for how preventive maintenance is to be conducted, as well as information regarding resource requirements, man-hours expected, and the periodicity for each action. Once an organization completes a PMS

¹ All nuclear preventative maintenance is governed by NAVSEAINST C9210.30A, Nuclear Reactor Plant Preventive Maintenance and Tender Nuclear Support Facilities Preventive Maintenance on Ships. This program is similar to the PMS system, and differences are insignificant in the context of this thesis.

item according to the MRC, it is documented on a Maintenance Index Page (MIP). MIPs are maintained onboard the ship as a reference for verification that all required maintenance has been completed, as well a reminder of maintenance that is due but has been deferred and remains outstanding (OPNAVINST 4700.7K 2003, Encl 4 p.2).

(2) Intermediate- / Depot-Level Preventative Maintenance The maintenance process is the same for shipboard preventative maintenance performed by intermediate or depot level organizations, however the documentation is slightly different. Intermediate and depot level organizations utilize the Maintenance Resource Management System (MRMS) instead of the PMS System. Detailed maintenance descriptions, resource requirements and periodicities are maintained within the Master Job Catalog (MJC) as MJC items. MJC item completion and outstanding maintenance are also maintained within the MJC (Ibid).

b. Corrective Maintenance

Corrective maintenance consists of actions intended to return or restore equipment to acceptable performance levels. Decisions made about corrective maintenance actions are made in accordance with the RCM principles described previously, in an attempt to optimize reliability and cost considerations. The decision to perform corrective maintenance is based solely on equipment condition (OPNAVINST 4700.7K 2003, p.6).

The subset of the 3-M System used to manage shipboard corrective maintenance is the Maintenance Data System (MDS). This system allows personnel onboard each ship, at any time, to input any changes to the status of their equipment. Whenever an item is determined to need corrective maintenance, shipboard personnel designate a Job Control Number (JCN) for identification, along with a description of the problem, parts required to fix the problem, any accompanying technical data, priority and availability type required to complete the maintenance (depot, intermediate, additional technical assistance, organizational).

The compilation of all JCNs, and their accompanying data, is known as the Current Ship's Maintenance Plan (CSMP). These data can be easily transmitted from the ship to its shore-based command, where further review of the problem and final approval of the corrective action takes place. Work packages are created and intermediate- and depot-level availabilities are coordinated around the contents of the ship's CSMP. A current, accurate CSMP provides the gauge for each ship's material condition (Ibid).

B. NAVY MAINTENANCE CHANGE

The change in the funding structure for Navy shipyard depots to be examined by this thesis was a byproduct of a larger decision to streamline the maintenance process and to reduce the shipyard infrastructure, thus improving the efficiency and effectiveness of shipyard operations. The driving force behind this decision was the end of the Cold War, which caused a paradigm shift in how the nation prepared for war and how the nation's resources would be allocated to support national defense.

The U.S. military policy during the Cold war resulted in tremendous capability, and as a byproduct, infrastructure to support its forces afloat. A lynchpin of President Reagan's strategy was the creation of a 600 ship Navy. In 1987, the Navy had reached 568 ships (O'Rourke 2002, p.2).

The prevailing view of the country's strategic capability requirements began to shift beginning with the fall of the Berlin Wall and the collapse of Communism throughout Eastern Europe in 1989. Then in 1990, the idea of a new type of war against a regional threat manifested itself when Iraq invaded Kuwait. This new war was not against an ideological superpower, but rather against rogue leaders aimed toward regional domination and in pursuit of nuclear, biological, and chemical weapons. How Desert Storm was fought began a dramatic change in how our forces were structured (Aspen 1993). By 1991, the Navy ship inventory had dropped to 526, with planning estimates placing the 1995 number at 451 (GAO 1992, p.3).

In 1992, the National Military Strategy of the United States officially shifted the focus from containing the spread of Communism and deterring Soviet aggression to a

more flexible, regionally oriented strategy. This change aimed to allow the United States the opportunity to meet threats at lower costs, without a large mobilization of forces (GAO 1992, p.20). Immediately upon entering office, President Clinton began the *Bottom Up Review*. The goal of this study was to identify how the changes in the military should affect force structure, modernization and infrastructure. It also identified the lack of a strong economy as an economic danger to national security. Subsequent to the release of the report on the *Bottom Up Review*, President Clinton proposed a \$60 billion cut to the Defense budget over the next six years in an effort to reduce the 1992 \$425 billion operating deficit (Larson, et al. 2001, p.41-44).

In addition to essentially halting shipbuilding, the country's ship support infrastructure was quickly identified as an area that could be significantly reduced. In 1992, the Joint Chiefs of Staff Depot Consolidation Study estimated a 25-50% excess capacity within the depot maintenance system. Subsequent testimony before the Armed Forces congressional committee found the JCS study to be conservative (GAO 1993, p.1). During the 1991, 1993 and 1995 Base Realignment and Closure (BRAC) Commissions, the number of depot-level shipyards was cut in half, eliminating shipyards in Philadelphia, Pa., Long Beach, Ca., Mare Island, Ca., and Charleston, SC. The Subic Bay, Philippines facility was also closed, leaving only two remaining overseas ship repair facilities. Without the Navy's shipbuilding business, the private sector was forced to make significant changes in its operations as well. Fourteen private shipyards possessed the capability to construct warships in 1990. By 2003, there were only six (Truver 2004).

C. CHANGE IMPLEMENTATION

Whereas increased cost effectiveness was the goal of the shipyard infrastructure reduction, an ever shrinking budget, even for the shipyards that remained in operation, necessitated a shift toward improved operational efficiency as well. In 1990, the Office of the Secretary of Defense (OSD) issued a memorandum titled, *Strengthening Depot Maintenance Activities*, which directed each Service to seek cost savings through improved efficiency of operations. Later that same year, OSD established the Defense Depot Maintenance Council (DDMC) to review DoD maintenance policies, systems,

programs and activities, to advise OSD on cost reduction initiatives within depot maintenance, and to provide a forum for maintenance commands to exchange information and ideas (DoD Directive 5128.32).

Defense Management Report Decision (DMRD) 908, issued on 17 November 1990, was the first product of the new council. In it, the council targeted savings of \$3.9 billion by FY 1995 through improved short- and long-term depot operations. The following year, the DDMC outlined how this would be accomplished in its *Corporate Business Plan for FY 91-95*. The council identified increased contract competitions, further closures, workload realignment and inter-Service transfers as the mechanism by which the savings could be achieved (Bachmann 1995, p.23).

To meet the requirements established by the Department of Defense, the Chief of Naval Operations (CNO) developed a Regional Maintenance Plan (RMP). The objectives of the RMP were to:

- Emphasize process improvement while maintaining customer responsiveness and Fleet readiness.
- Eliminate excess infrastructure capacity and capability.
- Better integrate supply support and maintenance requirements.
- Provide management visibility of all maintenance-related costs.
- Provide compatible Automatic Data Processing management across all levels of maintenance.
- Preserve the requirement for positive technical control.
- Reflect DoD and Navy Core Competencies Policy (CNO 1994).

The CNO's message also identified three phases for RMP implementation:

- Phase One – Optimize intermediate-level interoperability by minimizing redundant capacity and capability through process improvements and

resource sharing, and develop prototype centers of excellence, called Regional Repair Centers.

- Phase Two – Integrate intermediate- and depot-level activities and establish Regional Maintenance Centers (RMC), consisting of a confederation of Regional Repair Centers.
- Phase Three – Conduct Fleet maintenance using single maintenance process supported by common business and production practices. (Ibid)

The RMP began to come to fruition in 1995, when the Pearl Harbor Shore Intermediate Maintenance Activity consolidated with the Submarine Base Pearl Harbor Intermediate Maintenance Activity, and later with a similar consolidation of the two Puget Sound intermediate maintenance facilities. As part of these consolidations, the Navy's funding mechanism for its shipyards shifted from the NWCF to that of mission funding. Chapters III and IV describe in detail the workings of these two financing mechanisms and how they operate in the shipyard context.

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III. MISSION FUNDING

Mission funding is the term commonly used to describe the process of financing all aspects of a Navy maintenance organization through a direct congressional appropriation. This is the process used to fund the IMFs at the Pearl Harbor and Puget Sound shipyards, as well as the process chosen to fund the entire shipyards once depot and intermediate-level maintenance were combined under a single command. This chapter describes the mission funding process, as well as its evolution and its impact on Navy shipyards. It will also explain the intricacies of mission funded programs, to allow a comparison with working capital funds (described in Chapter IV).

A. ORIGINS OF DIRECT APPROPRIATIONS

All forms of government spending originate with a legislative appropriation. This responsibility is articulated in Article 1, Section 9 of the Constitution:

No Money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law; and a regular Statement and Account of the Receipts and Expenditures of all public Money shall be published from time to time.

The scope of this responsibility has changed dramatically since the penning of the Constitution. Whereas early Congresses had no formal budget and were able to disperse appropriations as individual line items, the growth of the country, both physically and politically, has added significant complexity to the process of spending money.

The Budget and Accounting Act of 1921 established the framework for the current budget process. This act gave the President the responsibility of establishing central oversight for the nation's spending priorities, requiring the President to submit a consolidated budget request to the Congress each February. In addition, this act created two government agencies to assist in the budget process: the Bureau of the Budget (restructured in 1970 as the Office of Management and Budget [OMB]) was formed to assist the President in this responsibility, and the General Accounting Office (now Government Accountability Office [GAO]) was created to assist Congress as the principle auditing agency of the federal government (Saturno 1996).

In 1974, the budget process evolved further with the passage of the Congressional Budget and Impoundment Control Act. This legislation created the House and Senate budget committees and provided for an annual concurrent budget resolution between the two houses as a mechanism for facilitating a joint budgetary decision. This Act also established the Congressional Budget Office (CBO) to support the budget committees with independent budgetary information and expertise (Ibid). The combined result of these two pieces of legislation essentially codified how the process works today.

B. CONGRESSIONAL BUDGET PROCESS

Once the President has submitted his budget request, the House and Senate budget committees hold hearings with analysts, staff, industry and the President's administration to better understand the proposal. The budget committees then submit their budgetary estimates and overall opinion of how the budget should be constructed in a report, known as a resolution, to be debated within their respective house of Congress.

After the entire House and Senate have had the chance to voice their opinions and provide feedback to their respective budget committee, a budget resolution is drafted. House and Senate conference committees then meet to resolve any differences, which results in a composite budget resolution. This resolution is then returned to both houses for an up or down vote. Upon being passed by both houses of Congress, this concurrent resolution then establishes a ceiling for the respective appropriations committees in structuring their appropriations. Although the resolution is not law, it acts as an internal control for the rest of the budget process and can be enforced by a member of Congress if attempted to be breached (Tyszkiewicz and Daggett 1998, p.31-32). The concurrent resolution breaks the budget down into twenty budget functions (see Figure 1).

050 - National Defense	550 - Health
150 - International Affairs	570 - Medicare
250 - Space and Science	600 - Income Security
270 - Energy	650 - Social Security
300 - Natural Resources and Environment	700 - Veteran's Benefits
350 - Agriculture	750 - Justice
370 - Commerce and Housing Credit	800 - General Government
400 - Transportation	900 - Net Interest
450 - Community Development	920 - Allowances
500 - Education, Training, Employment	950 - Undistributed Offsetting Receipts

Figure 1. Congressional Budget Functions
(From Author)

1. Authorization and Appropriation

National Defense spending authority is typically granted by Congress through two acts: The Defense Authorization Act and the Defense Appropriations Act. The Authorization Act is used to set policy and authorize programs. This act provides the legal authority for DoD to create, continue, change or abolish programs, activities and entire agencies, as well as setting the conditions under which these functions can operate (Ibid, p.34). The House and Senate Armed Services committees maintain jurisdiction over the Defense Authorization Act, including the portion of the Defense Appropriation to be allocated to Navy shipyard maintenance. The process of creating the Defense Authorization Act is similar to the budget resolution process, except it is signed into law.

While the Authorization Act, in addition to determining which programs will be executed, may also recommend spending levels for programs and activities, the sole purpose of the Defense Appropriations Act is to provide funding for the authorized agencies, programs, and activities. The annual appropriations process provides funding for discretionary² programs through eleven appropriations acts covering the budget functions identified in Figure 1. The congressional appropriations process is similar to that of the budget resolution and the authorization process. Both, the Defense

² There are two types of government spending, Discretionary and Mandatory. Discretionary spending requires an annual spending bill for its continued funding; whereas mandatory spending is spending that has been provided for by permanent law (e.g. Social Security and Medicare) and requires no additional legislation for its continued existence

Authorization Act and the Defense Appropriations Act, are passed in both houses of Congress and are signed into law by the President.

2. Congressional Appropriations Subdivisions

Congressional appropriations for the Department of Defense are divided into seven major subdivisions, each specifically appropriated for the individual Services. The following shows these subdivisions and the major activities the Navy funds under each:

- Military Personnel (MPN) – Includes pay and allowances for officers, enlisted personnel and midshipmen, enlisted personnel subsistence, permanent change of duty station travel and other personnel costs.
- Operations and Maintenance (OMN) – Includes maintenance for operational forces, mobilization, training, recruiting, administration and service wide support.
- Procurement – Includes Aircraft (APN), Weapons (WPN), Shipbuilding and Conversion (SCN), Other (OPN) and ammunition procurement.
- Research, Development, Test and Evaluation (RDT&E) – Includes basic and applied research, technology development, demonstration and validation, engineering and manufacturing, RDT&E management support and operational systems development.
- Revolving and Management Funds – Includes Supply Management, Depot Maintenance, Naval Warfare Centers, Naval Research Laboratory, Transportation, Public Work Centers and Naval Facilities Engineering Commands.
- Other Defense Programs – Includes health care for Navy personnel.

- Military Construction³ (MCN) – Includes major and minor construction, planning and support activities, and historical projects (Candreva 2005, p.75, DoD Appropriations Act 2006).

An example of the language of an appropriation can be seen in Figure 2.

OPERATION AND MAINTENANCE, NAVY

For expenses, not otherwise provided for, necessary for the operation and maintenance of the Navy and the Marine Corps, as authorized by law; and not to exceed \$6,003,000 can be used for emergencies and extraordinary expenses, to be expended on the approval or authority of the Secretary of the Navy, and payments may be made on his certificate of necessity for confidential military purposes, \$29,995,383,000.

Figure 2. 2006 Defense Appropriations Act Language
(From DoD Appropriations Act 2006)

C. DEFENSE BUDGET PREPARATION

The creation of a budget request for submittal to the President is part of the biennial⁴ Planning, Programming, Budgeting and Execution (PPBE) System. The entire process is utilized by DoD to convert the President's National Security Strategy into the programs required to support that strategy and the budget plan to execute those programs. The Planning phase produces the documents that provide strategic military guidance which support the President's policies. The Programming phase defines the hardware, manpower, training, support and other needs that will best carry out this strategic guidance. The output of the Programming phase is the Program Objectives Memorandum (POM). This document is a six year resource allocation plan that serves as the backbone of the budget process (Candreva 2005, p.35).

³ Military Construction is a congress appropriation of its own. All other appropriations are found in the language of the Defense Appropriations Act.

⁴ Although Congress requires a Presidential budget request annually, the PPBE process is a biennial process. In off-years, Program Reviews are conducted to incorporate any fact-of-life changes. Services can request off-year changes to DoD via Program Change Proposals or Budget Change Proposals.

Budgets are built from the ground up at the Service level. The process begins at the cost center level. A cost center is one of any number of departments within an organization. It identifies its costs and provides this input to its organization's Fund Administrating Activity (FAA).

The FAA is responsible for the management of its cost centers' resources. FAAs evaluate and incorporate their unit's budget requests into a consolidated organizational budget request to submit to their assigned Type Commander, the next step in the Navy's operational command structure.

The budget is reviewed and refined as it is forwarded up the chain of command, to the Budget Submitting Office (BSO), where all of a BSO's subordinate budget requests are consolidated into one Budget Estimate Submission (BES). This BES is then forwarded to the Navy Office of Budget (FMB) where it is incorporated with all other Navy BES's into one consolidated budget request. It is approved by the Assistant Secretary of the Navy (Financial Management & Comptroller), as well as the Secretary of the Navy (SECNAV). Once the Navy completes its review, the budget request is sent to the Office of the Secretary of Defense (OSD), where it undergoes another review and is consolidated with the budgets of the other Services, becoming the DoD budget request. Finally, the DoD budget request is sent to the Office of Management and Budget (OMB) and is incorporated into the President's budget (Ibid, p.49-54). Figure 3 provides an example of the budget submission process for the mission funded Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility (PHNS & IMF).

Important to note about how the Navy prepares its budget is that, while its cost centers provide ground level, accurate cost information, their budgets do not include the entire cost of their organizations. In the same way Congress separates its defense appropriation into subdivisions, the Navy also divides the responsibility for building its budget. For example, a large portion of the government's cost at PHNS & IMF is its military personnel. However, this cost is not included in its budget request. Instead, military personnel costs are budgeted on a Navy-wide level, by the BSOs that manage the Navy's personnel, such as the Naval Education and Training Command (NETC), the Bureau of Medicine and Surgery (BUMED) and the Naval Personnel Command (NPC).

Similarly, regardless of where a building is constructed, all Navy construction is budgeted by the Naval Engineering Facilities Command (NAVFAC) and the Naval Installations Command (CNI) (Candreva 2005, p.37).

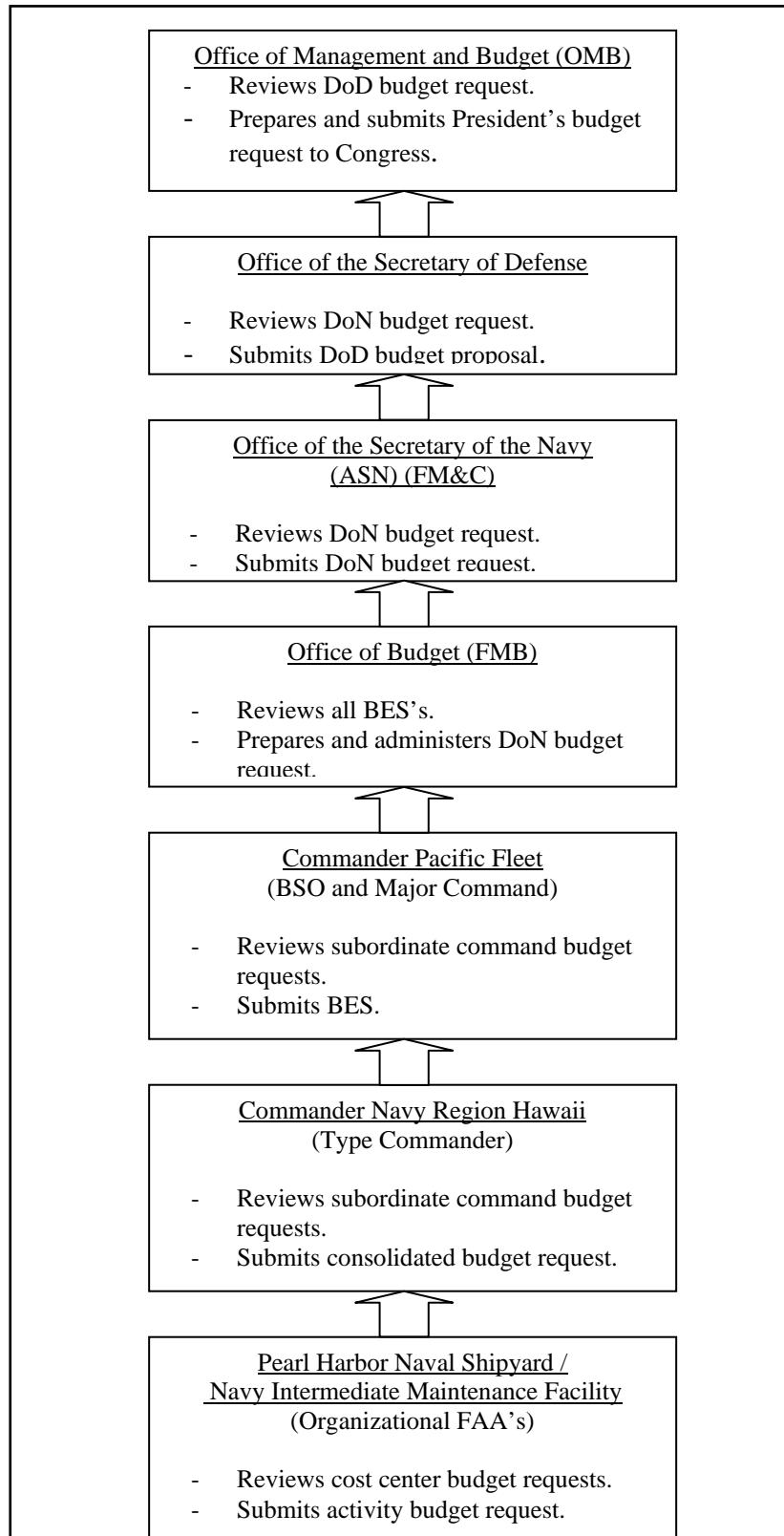


Figure 3. DoD Budget Preparation Process for PHNS & NIMF
(From Author)

D. DIRECT APPROPRIATION RESTRICTIONS

When the Defense Appropriations Act is signed into law by the President, the contents of the act represent obligational authority in the amounts appropriated. Obligational authority is the ability to enter into an agreement which will require the government to make a payment, now or sometime in the future. For example, Figure 2 shows obligational authority for the Navy to spend \$29,995,383,000 in government money for OMN expenses. Congress does not issue this money to the Navy, but does allow the Navy to incur expenses of this amount to be paid by the U.S. Treasury.

The obligational authority Congress grants the Navy is accompanied by rules regarding its execution, specifically: the purpose of the expenditure, the time period in which it is incurred and the amount available for obligation.

1. Purpose Restrictions

The purpose of an appropriation can be as specific as a line item within the Appropriations or Authorization Act. It can also be as broad as a lump sum amount for a category like OMN. Two requirements must be met to ensure money is being obligated for its designated purpose:

- If the purpose is included in the BES and is not otherwise prohibited by law, it is legally available even if it is not specifically mentioned in an appropriation.
- Likewise, if an item is otherwise prohibited by law, even if it is included in the BES and appropriations are made available without mentioning the item, the appropriation is not available to be obligated for that item.

To avoid requiring every minor expenditure item to be included in the BES, agencies are given discretion concerning the purpose of their obligations under the *Necessary Expense Doctrine*. If an expenditure is logically related to an appropriation, is not prohibited by law and is not covered under a separate appropriation, it can legally be obligated (Candreva 2005, p.73-74).

2. Time Period Restrictions

When Congress appropriates funds for the execution of a program, it is not just permission, it is a legal requirement. As such, appropriated funds are made available for a set duration of time to ensure their timely execution and to prevent a stockpiling of available funds by executive agencies.

The first period of time in the life of an appropriation is the obligation availability period. For the duration of this period, funds are available to incur obligations. In other words, the agencies who receive these appropriations may enter into contracts that will require the payment of their allotted funds. This period varies for different appropriation types. For example, due to the long term nature of a procurement account, they have three to five year obligation availabilities, and are termed *three (five) year accounts*. OMN accounts are *one year accounts*, which makes sense given the shorter time horizon in funding periodic maintenance as well as the need to annually revisit the cost of funding operational forces in light of changing world situations. Once the obligation availability period is over, the account is considered expired and no further contracts can be incurred under that appropriation (Ibid, p.72).

An additional requirement of an obligation availability period is that all obligations must be used to meet a need that exists during that period. For example, if an agency finds itself with an excess of OMN funds at the end of the fiscal year⁵, it is not allowed to enter into a contract for a good or service that it does not currently need, but it anticipates it will need during the next fiscal year. This is referred to as the *Bona Fide Needs Rule*. Appropriations are available only to meet the bona fide needs of their respective obligation availability period (Ibid, p.77).

The expiration of an appropriation's obligation availability period does not mark the end of its life. Although contracts must be entered into during the obligation availability period to meet the needs arising in that period, the delivery of the goods and services contracted does not have to be crunched into that time as well. Immediately following the expiration of an obligation availability period begins an appropriation's

⁵ All obligation periods coincide with the Federal fiscal year, from October 1 – September 30. For one year funds, the obligation availability period for that appropriation expires at the end of the fiscal year.

expenditure availability period. This period is five years in duration for all appropriation types, and during this period the obligations incurred in the obligation availability period are liquidated as the contracted goods and services are received (Ibid, p.72).

The end of the expenditure availability period marks the end of an open appropriation. No further claims can be charged to its account and all outstanding obligations are cancelled.

3. Obligation Amount Restrictions

In addition to the congress restrictions placed on the use of funds and the periods in which they are to be obligated and expended, there are also fiscal restrictions placed on the amount of money available in an appropriation. The statute governing the over-obligation of an appropriation is referred to as the Anti-Deficiency Act. Its first key provision disallows obligations or expenditures from exceeding the amount available in an appropriation. The second prevents the obligation of funds prior to an appropriation being written into law (Ibid, p.79-80).

This may seem intuitively obvious, given the fact that a budget implies a limitation on funds available to spend. However, when accompanied with time and purpose restrictions, meeting this requirement can become tricky. If an obligation is initially incorrectly charged to one account, in the process of correcting accounting records it could be found that the correct account does not have the funds still available to cover the expense of the obligation. In this example, a problem in determining the proper purpose of an appropriation would result in the over-obligation of an appropriation, creating an Anti-Deficiency Act violation. Problems can also occur if an obligation is made and delivery occurs in a subsequent fiscal year, then it is determined that it was not a bona fide need of the fiscal year in which it was obligated. In this example, the correct funding would be from the next year's appropriation. However, since there were no appropriations yet authorized for the following fiscal year, the contract would be in violation of the Anti-Deficiency Act, as it would have obligated funds prior to them being legally available.

The previous scenario also displays how budgetary limitations on how long funds are available for obligation can cause problems transitioning from one fiscal year to the next. While the congressional budget cycle attempts to write the next fiscal year's Appropriations Acts prior to the end of the current fiscal year, often political differences lead to delays. This can cause a period of time for mission funded activities where the previous obligation availability period has expired, but no funds have been made available for new obligations. As has been shown, managers are not allowed to enter into contracts in the expectation of eventual funding. To combat this problem, Congress can pass what is called a Continuing Resolution Authority (CRA). CRAs authorize organizations to enter into new obligations at a designated spending rate until a new Appropriations Act has been passed. Under a CRA, only programs that have previously been authorized are allowed obligations. In other words, organizations are not allowed to circumvent congressional review by starting new programs during a CRA period.

E. BUDGET EXECUTION FOR MISSION FUNDED ORGANIZATIONS

Once the Defense Appropriations Act is signed into law by the President, the flow of funds follows a similar path as the budget request in the opposite direction. The treasury first opens accounts for each appropriation in order to allow proper tracking of the obligation made against them. It then passes this information to OMB in the form of treasury warrants. The challenge for OMB is to then spend the funds in their entirety, for the correct purpose, without overspending. To ensure deficiencies do not occur due to overspending an account, Federal law requires OMB to regulate spending by distributing funds in apportionments. In this format, spending authority is distributed incrementally, typically quarterly. The objective is to ensure organizations have the funds necessary to meet the full intent of the appropriation without running out of funds prior to the end of the fiscal year.

OMB apportions funds to OSD, who then allocates funds to each Service. Services distribute funds amongst their Major Commands. These funds are also apportioned quarterly. The Major Commands issue spending plans, called allowances or

Operating Targets (OPTAR), to their subordinate commands. These FAAs are then responsible for the execution of these plans according to their budget requests. This process is shown in Figure 4.

F. INTERMEDIATE MAINTENANCE FACILITY OPERATIONS

The two separate Intermediate Maintenance Facilities at Pearl Harbor operated as mission funded organizations under the Pacific Fleet Command (COMPACFLT) prior to the consolidation efforts at the PHNS. In submitting their budget proposals, the vast majority of their costs centered on OMN expenses, which covered the costs associated with maintaining their facilities, providing the materials and services necessary to support the submarines and surface vessels they maintained, and paid their civilian salaries. All military salaries were covered by the MILPERS budget requests, all new construction requests were covered by the MILCON appropriation, and any capital expenditures were submitted within various Procurement budget requests.

As primarily OMN budgets, IMFs utilized one year funds allotted quarterly by their respective chain of command. Since the appropriations covering IMFs were paid for directly through congressional appropriations, the beneficiaries of IMF work received a *free* product. In other words, the applicable authorizations and appropriations designated that the funds provided were to be used to perform a certain amount of maintenance on ships under the supervision of the Pacific Fleet. COMPACFLT determined the maintenance schedules and priorities, and this maintenance was conducted to the maximum extent of their appropriations.

The financial operation of a shipyard under the NWCF varies significantly to one receiving direct appropriations. Chapter IV explains the NWCF and its application to Navy shipyards.

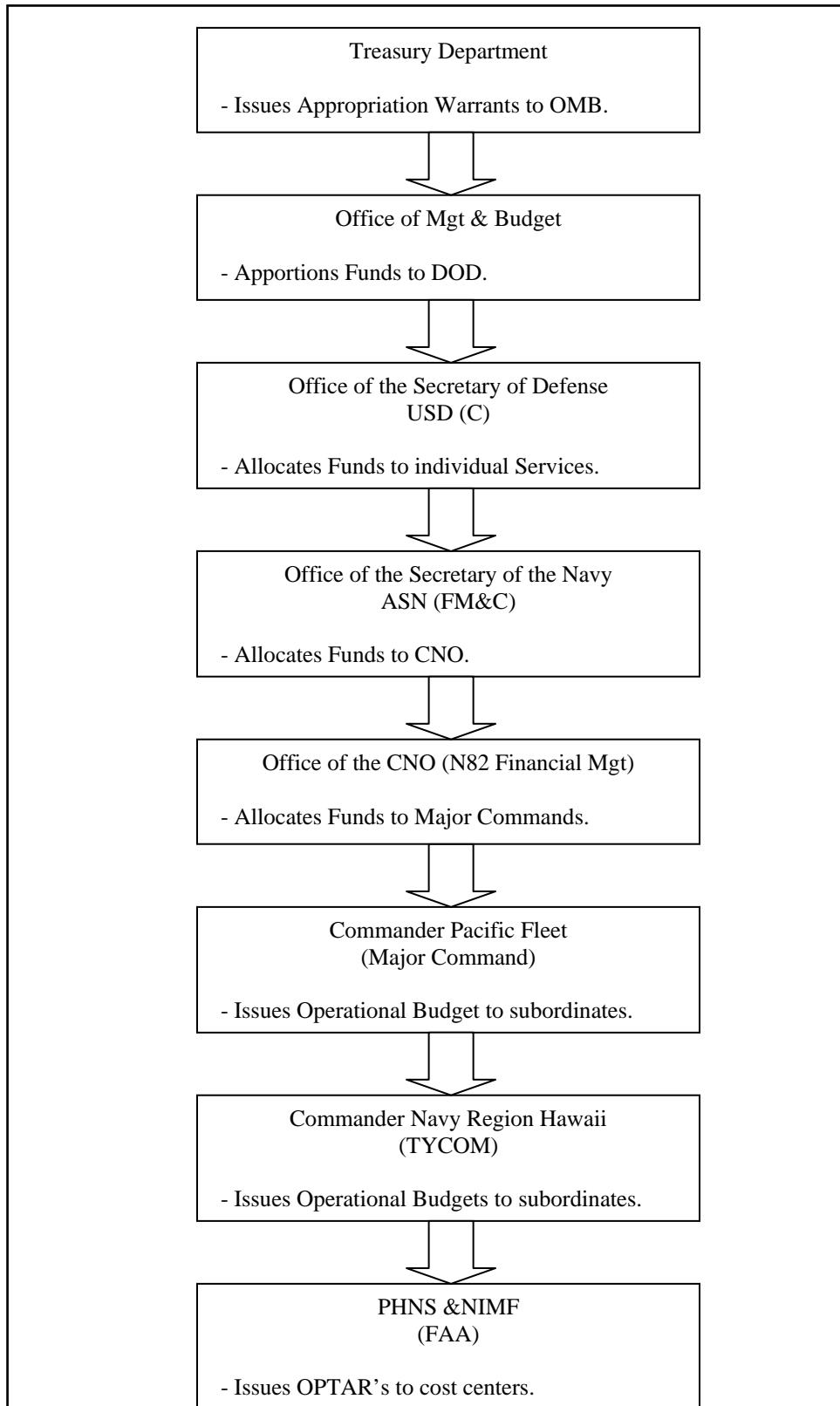


Figure 4. Mission Funding Budget Execution
(from Author)

IV. NAVY WORKING CAPITAL FUND

Essentially all of the funding the Navy receives originates from the direct appropriations, or mission funding (MF), written to support its mission. A unique form of management used by specific organizations to execute this mission is the Defense Working Capital Fund (DWCF). The DWCF is a revolving fund, it finances its own operations by charging for the services it provides to the customers it supports. For the organizations that utilize this financial strategy, it creates a pseudo-entity, which attempts to adopt private business practices in meeting the needs of its customers.

A. THE FORMATION OF THE DWCF

The Navy has managed various forms of revolving funds since the 1800s, beginning with a General Account of Advances used to more effectively obtain and distribute inventoried supplies to its sailors. Revolving funds were formally recognized by Congress as part of the National Security Act Amendment of 1949. Prior to the formal establishment of a DWCF, the Navy, along with the other services, maintained separate revolving accounts in the form of stock funds and industrial funds. Stock funds managed the procurement and distribution of inventory items and industrial funds managed services and materials such as depot-level shipyard maintenance (Candreva 2005, p.91).

The renewed focus on the country's economic well-being, which spurred the defense changes discussed in Chapter II, also affected these revolving funds. In 1991, Congress established the Defense Business Operations Fund (DBOF) to bring a business approach to the operation of the Services' revolving funds. The DBOF consolidated stock funds and industrial funds from each service into a central Department of Defense (DoD) level account. The purpose of the DBOF was to reduce the costs of operation for the revolving fund activities by establishing increased cost visibility, thus allowing managers to improve the quality of the products and services they provided, while also providing those services in the most efficient and effective manner. It also allowed the overall cash cushion to finance operations to be reduced, since the individual funds were now part of a larger pool. Included in the DBOF were transportation, supply management, finance and

accounting and depot maintenance accounts. As a result of the reduction in cash levels, problems arose in managing the cash flow for all the separate entities included in the fund. In FY96, DoD again restructured its revolving funds to better manage the cash flow within its account. It was divided into separate Defense Working Capital Funds (DWCF): Navy, Army, Air Force, Defense-Wide, Defense Commissary and Other Defense. In addition to easing the central DBOF's cash flow management problems, this restructuring also returned the responsibility to effectively manage these funds to the Services. The current Navy Working Capital Fund (NWCF) is subdivided into five activity groups: supply management, research and development, transportation, base support and depot maintenance (OSD Comptroller iCenter).

B. NWCF OBJECTIVES

The NWCF is not a congressional funding method, but a financial management strategy for organizations that serve congressionally funded programs. Under mission funding, a maintenance depot is run directly by the Fleet it serves. In contrast, shipyards that operate under the NWCF are their own entities. In short, a working capital fund changes the flow of resources and decision making for the activity utilizing its financial structure. In the case of a Navy shipyard, without a working capital fund, the shipyard receives funding from the appropriations process via the Fleet Command it serves. Shipyard managers then provide maintenance to the Fleet at the level this funding can support. From the Fleet's perspective, once it has allocated obligation authority to the shipyard, the maintenance it requests is prepaid. Under the NWCF, the funds from the appropriation process are provided directly to the Fleet. The shipyard and the Fleet then enter into a buyer/ seller relationship rather than a subordinate/ command relationship (See Figure 5). The shipyard determines the total cost of doing business, including direct costs, indirect costs, overhead and general and administrative expenses, and then bills the Fleet for every job it performs (OSC Comptroller iCenter).

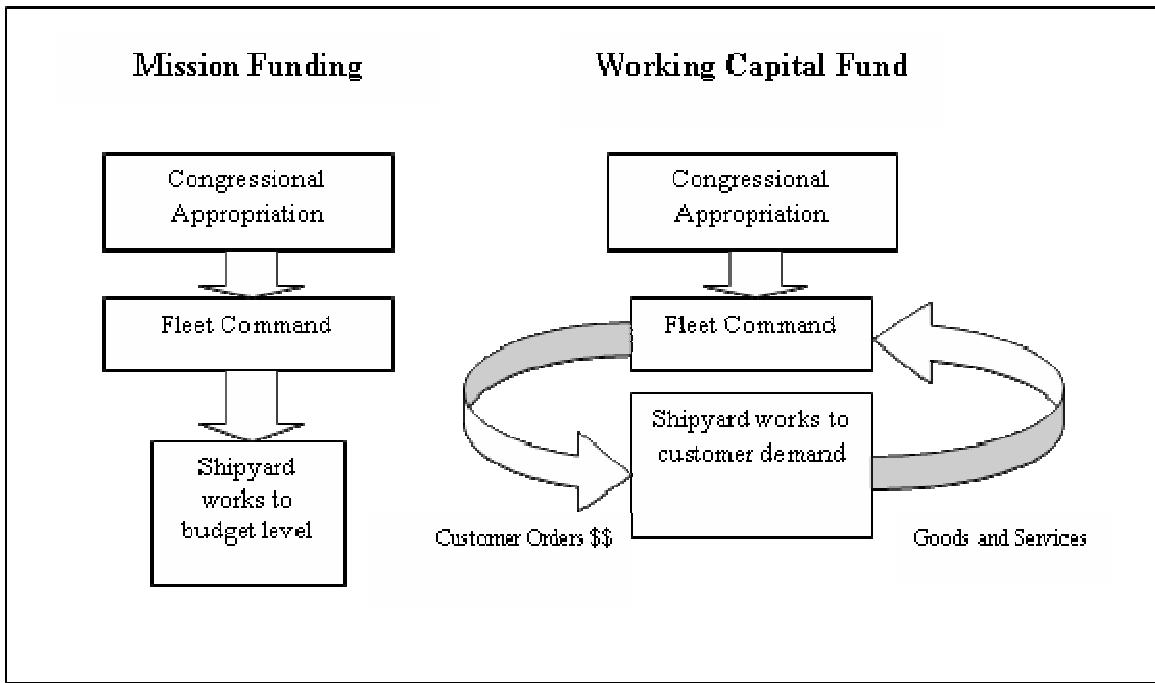


Figure 5. MF vs. NWCF Organizational Relationships
(After: DOE 2003, p.4)

The goal of a NWCF within an organization is to streamline operations and maximize resources. By establishing clear customer/provider relationships, adopting private-sector techniques for resource management, consolidating key functions, and using activity-based accounting policies to display full costs, NWCFs provide managers with the cost and performance data required to make effective and efficient decisions. Its total-cost awareness facilitates business-like processes and budget choices that are responsive, unbiased, and mission-driven (OSD Comptroller iCenter). The NWCF provides the following benefits:

- Identifies the total cost of DoD goods and services to Congress, military users (buyers), and those who provide goods and services (sellers).
- Promotes more efficient and effective allocation and use of resources.
- Underlines the cost consequences of choices and allows purchases to be made in anticipation of future funded orders.

- Provides managers with the financial authority and flexibility to procure and use manpower, materials, and other resources more effectively.
- Improves cost estimates and cost control through comparison of estimates and actual costs.
- Places customers in the position of critically evaluating purchase prices and the quality of goods and services ordered.
- Allows for greater flexibility and security in decision making as there are no fiscal year limitations.
- Establishes standard prices or stabilized rates and unit prices for goods and services furnished by NWCF Business Areas, enabling customers to plan and budget more confidently (Ibid).

C. NWCF OPERATION

The term revolving fund is derived from the cyclical nature in which cash *revolves* into and out of the account. Customers replenish the fund by purchasing goods and services, while at the same time cash outflows finance the expenses necessary to produce the desired goods and services. A key to effectively managing these accounts is in accurately determining the total costs incurred in providing services and in forecasting the level at which these services will be demanded. To be considered for management using a NWCF, four criteria must be met:

- There must be identifiable goods and services provided.
- Customers requiring those outputs must also be identifiable.
- An approved accounting system must be utilized.
- An evaluation of the advantages and disadvantages of establishing a buyer/ seller relationship must be conducted (Candreva 2005, p.93).

Once an activity group (e.g., Navy depot maintenance) is established under NWCF management, a one-time appropriation or a transfer of funds from related appropriations, which will be supported by the new NWCF account, are used to create the initial pool of capital for the activity group. This capital is called a corpus. After funding

an activity group's initial corpus, those activities are no longer subject to an appropriation, but are solely reliant on customer orders to support the cost of their operations (Ibid). This makes accurate accounting of the total costs for each activity extremely important.

1. Cost Accounting for the NWCF

NWCFs recover costs using the unit cost concept (OSD Comptroller iCenter). The unit cost of an organization can be determined by dividing the total cost of its outputs by the total units of output produced. In short, the unit cost is the average cost for an organization to produce one unit of output. Figure 6 provides a simplified version of how this is accomplished:

Fleet Shipyard Incorporated (FSI) is a company that employs 100 workers and provides maintenance to keep its customers ships operational. Based on past experience and in talking with its customers, it anticipates it will incur the follow expenses in the upcoming year:

Labor Expense- (100 workers)*(\$100/hr)*(2000 hrs/yr) =	\$20,000,000
Expected Materiel expenses =	\$30,000,000
Overhead =	\$7,000,000
Depreciation =	<u>\$3,000,000</u>
Total Expected Expenses =	<u>\$60,000,000</u>

In this example, FSI expects to incur a total of \$60,000,000 in expenses for 2007. This number represents its Annual Operating Budget (AOB). It has decided to allocate those expenses on a direct labor hour (DLH) basis; for every hour one person works on a job, a set price is charged to that job. FSI employs 100 workers who will work 2000 hours each this year. However, some time is spent on training, break periods, etc. and so it expects each employee to spend 1500 hours on *direct labor* for its customers this year. The total DLH's available is:

$$(100 \text{ workers}) * (1500 \text{ hours}) = 150,000 \text{ DLH}$$

To recover all of its expected costs, the following calculation determines the price FSI will charge to its customers:

$$(\$60,000,000 \text{ Expenses}) / (150,000 \text{ DLH}) = \$400 / \text{DLH}$$

For every hour one person works on a job, the customer is billed \$400. This represents the price, known as the *stabilized billing rate*, FSI will charge for the following year.

Figure 6. Unit Cost Calculation
(From Author)

a. Full Cost Recovery

An important difference between MF and NWCF is in calculating the total cost of operations. As explained in Chapter III, organizations funded with direct appropriations do not budget for many of the costs incurred by their activity; instead they are funded by separate appropriations. For example, military personnel, funded through the MILPERS appropriation, are separately funded assets. However, organizations that operate under the NWCF are responsible for *full cost recovery*. Military personnel costs, along with all other costs of doing business⁶, are required to be captured. This total cost visibility is designed to link costs to outputs, providing managers with the information necessary to establish causal relationships between costs and cost objects. This helps to determine why costs were incurred, and to better provide services while minimizing the cost associated with those services.

D. NWCF BUDGET PROCESS

NWCF activities prepare an operating budget and a capital budget. The operating budget includes all direct, indirect, and general and administrative expenses expected for the budgeted year. The capital budget consists of the funding requested for investment expenses such as software, infrastructure, equipment and minor construction. Similar to the MF budget process, these cost estimates flow from the lowest organization level to the highest. Individual activities forward their operating and capital budget information to their activity group manager, who then forwards the collective information to the Service level. Final adjustments are made for inflation, pay increases and other fact of life changes. The Services also attempt to balance the NWCF budget forecast with the maintenance budget requests for the customers the NWCF serves. The final NWCF budget and unit cost information are then submitted to DoD as part of the overall DoD BES (See Figure 7). DoD then issues a composite billing rate for each activity group. It is important to note, however, that individual activities can utilize subsidiary rates that more accurately track their costs as long as the collective sum of these individual rates meets

⁶ Some costs, such as war reserves, underutilized plant capacity, and mobilization costs are still funded through direct appropriations. These items are deemed necessary for National Security, and are thus not included in the NWCF model (DoD FMR 2004, p.9-11).

the intent of the collective activity group rate (Candreva 2005, p.100). This allows flexibility in assigning billing rates at separate activities, whose production levels may vary significantly, and thus can spread fixed costs over a large customer base, helps to minimize substantial profits or losses at individual organizations.

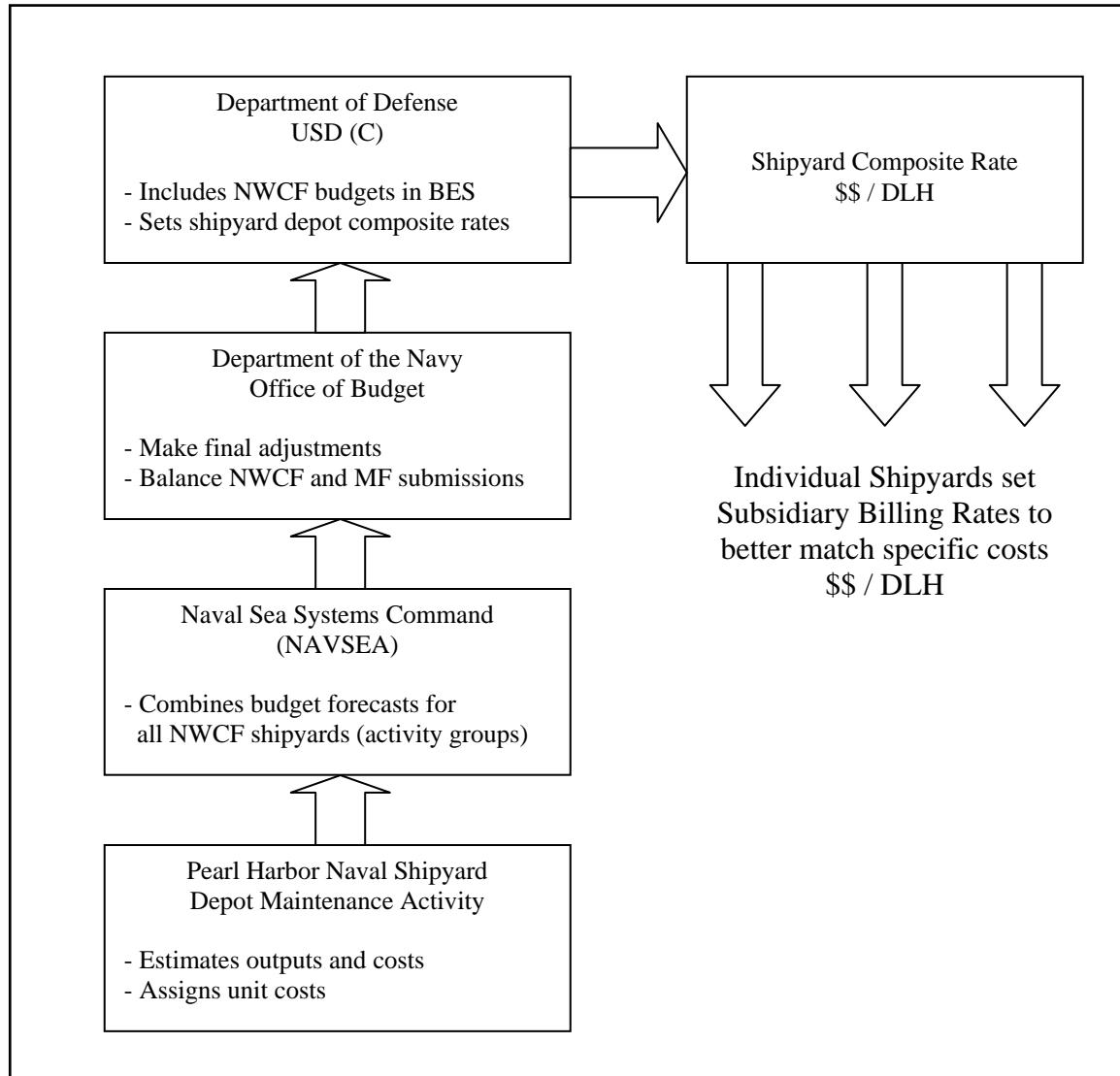


Figure 7. NWCF Budget/ Rate Setting Process
(From Author)

E. NWCF MANAGEMENT

Looking again at Figure 6, if FSI were a private company, included in its unit cost would be an amount above \$400 to allow it to earn a profit on its investment. However, DoD activities are not interested in making a profit, since they are not required to earn a return to the providers of the capital they use. The difference between an activity group's costs and the revenue it collects on an annual basis is referred to as the Net Operating Result (NOR). NWCFs seek to break even in their operations by achieving a NOR of zero. Real life changes in items such as customer demand, actual billable DLHs, and material costs can result in differences between actual revenue and expenses. Profits are displayed as a positive NOR, and losses as a negative NOR. Over the life of an account this difference is called the Accumulated Operating Result (AOR). To achieve a zero AOR over the life of an account, positive or negative NORs are rolled into the future billing rates an activity group charges (OSD Comptroller iCenter). An exception to this for depot maintenance activities is that gains or losses of over \$10M are required to be resolved during the current FY (or the first quarter of the following FY if they occur during the fourth quarter of a FY) (DoD FMR 2004, p.9-12).

F. WORKING CAPITAL FUND RESTRICTIONS

As discussed in Chapter III, one of the biggest challenges of operating with mission funded appropriations is meeting the restrictions Congress places on the obligational authority it provides. MF organizations must ensure expenses meet their authorized purpose, that they are obligated and liquidated within the allowable time period, and that they do not spend more than the amount appropriated. NWCFs have no such restrictions. While the customers they serve still must wrestle with these restrictions in determining what services to request and when, a NWCF shipyard has no fiscal year limitations in providing its services. NWCF organizations can provide their services at any level desired, constrained only by the capacity of their facility and the demand of their customers. Also, in the short term, by operating with a negative NOR, NWCFs allow shipyards, by essentially under charging the price of their services, to provide the Fleet with more maintenance than would otherwise be possible under MF. While this

method of operation can be seen as short sighted, since it sacrifices future maintenance costs for those of today, it is additional operational flexibility that MF does not offer.

Despite the freedom from appropriations oversight, the NWCF does have operating limitations to which managers must adhere.

1. Cash Management Restrictions

The availability of cash is of extreme importance for the NWCF. Activities pay their day to day expenses with the cash received from the services they provide; and while the NWCF can operate at a loss (negative NOR), improper cash management can result in insufficient funds to pay those expenses, which becomes an Anti-Deficiency Act violation (DoD FMR 2004, p.9-3). To prevent this, DoD Financial Management Regulations require NWCF activity groups to maintain cash levels to cover 7 to 10 days of operational costs and 4 to 6 months of capital asset disbursements (Ibid, p.9-2). To meet this requirement, plans are developed by activity groups to facilitate the cash flow management process. These plans are created annually and submitted with the BES. They coordinate collections, disbursements, appropriations, and estimates of other cash transactions (Ibid, p.9-3). Since the responsibility of cash management is maintained at the activity group level (NAVSEA for shipyards), scheduling changes and emergent repairs must be coordinated at a higher level than the shipyard itself, which can cause delays. Deviations in schedules can also have a ripple effect on the cash flow management at the other NWCF shipyards controlled by NAVSEA.

2. Efficiency Limitations

NWCFs are limited in the business aspects they promote. Shipyard managers do not operate in a vacuum when making decisions about their operations. The maintenance they perform is of the utmost importance for National Security. As a result, some costs that might not make sense from a business perspective are still deemed necessary. This can manifest itself in excessive inventory, contingent equipment, surge capacity and other costs to protect against *what if* scenarios. Some of this expense is mitigated through a separately funded appropriation; however, there are real limitations to business practices

in an environment where profit is not the sole purpose of the business. In addition, the cost reduction incentive that exists in the private market is artificial within DoD. Shipyards know their customer, and their customer is essentially tied to the shipyard for their maintenance work. Thus, the pressures that cause cost improvements in the private sector, the desire to keep or gain business and to earn a higher profit, are not present in a public shipyard environment. Instead, the drive of vigilant management and the real possibility of a future of dwindling defense funds must provide this incentive.

V. MISSION FUNDING VS. WORKING CAPITAL FUNDING

As discussed in Chapter II, the RMP undertaken by the CNO consisted of three phases. Phase I aimed to optimize capacity and eliminate redundancy of effort by establishing Regional Repair Centers. Phase II then integrated intermediate- and depot-level activities into Regional Maintenance Centers (RMC). Phase III represented the end state, the entire Fleet conducting its maintenance in a common way, capable of sharing resources and operating as one shipyard.

The RMP began implementation in Pearl Harbor with the combination of its two separate IMAs into one Navy Intermediate Maintenance Activity (Phase I). Subsequently, the Navy consolidated the new IMA with the PHNS depot-level maintenance organization (Phase II). This process was later repeated at the PSNS.

Phase II represented the more difficult of the two restructurings. Prior to the regionalization effort, the PHNS operated under the control of NAVSEA and was incorporated in the NWCF. Both IMAs were mission funded under the command of the COMPACLFT, and the combined IMA operated in the same fashion. Full integration of the two maintenance activities required the merger of separate chains of command as well as different financial systems. It was decided to place the new *PHNS and IMF* under the managerial control of COMPACLFT⁷, and to finance the entire organization using direct appropriations. The funding decision was made so the Fleet could incorporate its new organization into its already established funding structure (GAO 2001, p.25).

As PHNS was the first regionalized and consolidated maintenance activity of the CNO's RMP, and was thus a model for future consolidations, the Navy implemented the *Pearl Harbor Pilot* in 1998 to assess the consolidation's impact on cost, performance and productivity. The metrics used to evaluate the consolidation were:

⁷ NAVSEA would still maintain control over the technical requirements and maintenance operating procedures for the ships, while the execution of those requirements fell under PACFLT

- Direct labor hour cost.
- Total shop labor hours required to deliver a customer direct labor hour (A measure of personnel utilization).
- Productivity, measured by number of CSMP items completed
- Productivity, measured by CSMP backlog growth or reduction.
- Schedule adherence.
- Quality, measured by the number of deficiencies requiring rework.
- Efficiency, measured by the actual labor hours required to complete a job compared to the budgeted labor hours expected to be required.
- Quality, measured by the number of failure reports within 6 months of maintenance.
- Earned value, measured by the labor hours required to complete similar work items (GAO 2001, p.26).

It is important to note that the purpose of the Pearl Harbor Pilot was not to determine the superiority of one financing method over another, but to measure the benefits of maintenance consolidation and to determine the worth of continuing with further consolidations.

The effectiveness of the Pilot in measuring cost reductions and manpower utilization improvements has been scrutinized twice by the GAO, first in 1999, and then with a follow up report in 2001. Both, to varying degrees, evaluated the consolidations as holding the potential for sustained maintenance improvements at Pearl Harbor, and across Navy maintenance. The GAO also showed concern for the disagreement between the Navy and the DoD regarding the appropriateness of choosing mission funding over working capital funding as the preferred shipyard financing method. There were concerns about the overall health of the rest of the NWCF if the shipyards were removed, but specific to the shipyards, the following issues were identified:

- The potential loss of financial flexibility for shipyard managers due to the fiscal year restrictions placed on directly appropriated funds.

- The loss of cost visibility for shipyards as they moved away from the NWCF, which was designed, in part, to provide a funding mechanism that mimicked the cost accounting and management principles of the private sector.
- The loss of the buyer/ seller relationship between the shipyard and the Fleet, which encouraged cost control and responsiveness to customer requirements (GAO 1999, p.20-21).

A. PUGET SOUND PROTOTYPE

Despite these concerns, the completion of the Pearl Harbor Pilot showed positive results for the consolidation process, and in continuing with the RMP's goal of a single maintenance process, the Navy recommended shifting all shipyards to mission funding. However, Program Budget Decision (PBD) 700C, "Navy Amended Budget Estimates Submission," January 7, 2003, created another pilot program; a two-year prototype at the Puget Sound Naval Shipyard. This prototype integrated intermediate maintenance and depot-level activities and financing operations with mission funding, as was done at Pearl Harbor; the goal of the prototype was to determine the shipyard's ability to display the total cost visibility and performance accountability under mission funding as was achieved by the NWCF (DoD IG 2005, p.2). The metrics used to demonstrate this ability were:

- A document called a virtual 1307 report. This was based on NWCF Accounting Report 1307, used to document the total cost of shipyard operations.
- The ship availability schedule report, a measure of maintenance schedule adherence.
- The post availability quality report.
- Customer appraisals of the quality of maintenance performed (Ibid.).

B. PROBLEMS WITH USING SHIPYARD DATA

The Puget Sound Pilot built upon the Pearl Harbor Pilot, in that it again displayed the benefits of the RMP as a more efficient use of the Navy's maintenance resources. The additional goal of producing NWCF cost visibility in a mission funded environment, however, uncovered the difficulty in identifying specific metrics and producing the data that could positively confirm one financing method as superior to the other. The DoD Inspector General was highly critical of the study, as it felt the Navy was using metrics that built upon the Pearl Harbor Pilot showing the benefits of consolidation, but were used to justify mission funding as the preferred method of shipyard financing. This criticism identifies one of two major difficulties in examining data from either shipyard to determine the better of the funding mechanisms. The combination of the IMAs and the consolidation of the maintenance activities that occurred simultaneously with the change in funding method, along with significant changes in shipyard maintenance requirements due to the war on terror and other Navy and Defense initiatives, has made the effect of changing the funding mechanism difficult to isolate. The Navy's motivation for choosing the metrics it used to evaluate the Puget Sound Prototype may have been to show its consolidation plan in a positive light, but it is worth noting that when the CBO published an interim report comparing the NWCF and MF at Navy shipyards, the metrics it recommended for further study were also of an overall shipyard performance basis, not an attempt to isolate the funding mechanism variable. They also included variances of three of the four performance metrics used in the Puget Sound Prototype (CBO 2005, p.15).

The other major problem in using shipyard performance to identify one method as being preferable over another is that cost visibility, in and of itself, does not produce savings; improved performance and increased savings are the result of management's ability to effectively employ the data they can collect. In other words, even the greatest of metrics do not evaluate the NWCF vs. MF, but instead evaluate the shipyard managers who use their available data to improve performance.

For these two reasons, the determination of which shipyard financial structure is preferred should be made based on the examination of the potential advantages and

disadvantages of each method. The areas of cost visibility and operational and financial flexibility were chosen since these were the cornerstones on which the arguments for each method were made.

C. ANALYSIS OF OPERATIONAL AND FINANCIAL FLEXIBILITY

1. Personnel Flexibility

a. Personnel Cost

One problem encountered after the west coast shipyards were shifted to mission funding was that, during spikes in labor requirements, employing workers from NWCF maintenance activities (i.e. borrowing workers from an east coast shipyard) came at an incredible cost to the pocketbook of the mission funded activities. NWCF workers require a funded customer order and are employed at the NWCF fully burdened DLH rate. Conversely, if PHNS wanted to borrow workers from the mission funded PSNS, the only cost was the incremental travel expense, since all other expenses had already been paid through other appropriations.

From the standpoint of someone looking at the forest, and not the trees, in this scenario the overall cost is the same under either method. However, the Fleet does not get to operate with a *big picture* budget. Its funds are budgeted for nearly two years in advance, and once set, are limited by a statutory ceiling. From their perspective, it is of great advantage to have as much of the fixed costs associated with maintenance covered by means other than the labor rate they are charged. Then, when mission changes invariably occur (particularly increases), the corresponding incremental increase in their expense to purchase more shipyard maintenance is as low as possible. This increases the flexibility of the Fleet by allowing it to stretch its own pot of money further before it must request a reprogramming of funds from other accounts or a supplemental appropriation from Congress.

b. Workforce Utilization

Since the revenue a NWCF shipyard receives is based on the number of DLHs applied to a job, tracking this number is extremely important. As such, the Navy has seen the administrative requirements and job cost repercussions of quickly moving workers and assigning extra personnel to certain jobs as being a major cause of workforce underutilization at the shipyards. Its documents showed approximately 100 to 200 workers were daily assigned to its excess labor shop as a result (GAO 1999, p.12). Under MF, shipyard commanders can reassign workers immediately upon priority changes without either administrative burdens or financial accounting considerations.

Although these advantages are very real, the same flexibility has been achieved at the NNS by having the Fleet purchase a set number of labor days as a separate expense item. Under this plan, they have had access to approximately 100 workers to generally assign to their IMF as needed (CBO 2005, p.13). Also, although the shift to MF reduced the number of personnel assigned to excess labor to about 10 per day at Pearl Harbor, the process for assigning workers has changed to the point that excess workers are no longer identified by mission funded shipyards (GAO 2001, p.43). In this case, it seems there was a clear tradeoff between accurate, relevant data and immediate response capability. The 100 to 200 extra workers identified by the NWCF that were seen as being underutilized could have possibly been unnecessary (if the production schedule was not compromised by their absence), and could have eventually been eliminated. Although personnel should not be viewed as a variable cost that can be changed annually to adjust for demand, without tracking unused workers, personnel overcapacity will never be able to be positively identified as a possible cost saving area.

2. Financial Flexibility

a. Fiscal Year Flexibility

As described in Chapters III and IV, the nature of direct appropriations places significant fiscal year dependant restrictions on MF organizations that NWCF activities do not face. These added restrictions have raised concerns regarding the ability

of a MF shipyard to provide maintenance service to the Fleet in the event of a funding gap caused by a delay in an appropriation.

In theory, this is true. A shipyard operating under the NWCF is essentially free from the fiscal year limitations imposed on MF, and can incur costs without the written authorization of an appropriation. However, Navy shipyards do not operate in a vacuum. In order to incur costs, they must receive revenue from their customers. The only two customers Navy shipyards serve are the Fleet and NAVSEA, both of which are MF organizations. This means that, in the event of a funding gap, although the shipyard could incur costs without regard to appropriation delays, it would be illegal for their only customers to purchase the maintenance they provide. Under either funding method, shipyards would be permitted to continue projects that had been previously obligated but not yet executed.

Funding gaps are not uncommon for government agencies, however most are typically only a few days in duration and cause little disruption. The disruptions caused by funding gaps, and even the additional restrictions placed on activities when funding gaps are plugged by continuing resolutions, affect the obligation authority of the customers buying the shipyards' services and NWCF shipyards cannot divorce themselves from the laws placed on appropriated funds.

b. Maintenance Costs Exceed Appropriations

When budgets are formulated by shipyard customers and rates are set for shipyard services, rates for materials, personnel expenses and other items must be estimated as they cannot be known for sure in advance. For a MF organization, due to the statutory ceiling on its spending authority, an increase in costs above what is budgeted for results in fewer goods and services that can be provided. Fleet customers operating with a NWCF shipyard have additional flexibility in this regard, however, due to the ability to carry a negative NOR. In short, the Fleet can continue to pay the budgeted price and have the shipyard eat the loss as it provides goods and services (if they have gone up in cost). In this way, the Fleet can buy the same amount of service as it has budgeted for regardless of price fluctuations.

This flexibility can be of advantage; however it does come at a price. One year's negative NOR is rolled into the following year's rate, meaning the cost of the next year's services will include any real cost increases plus the cost increases absorbed by the shipyard the previous year. As described in Chapter IV (p.56), NWCF shipyards can adjust their rates quarterly to alleviate a large NOR. In this way, the Navy can choose whether it wants to sacrifice future maintenance costs for additional service now, or if it wants to buy its services at as close to the going rate as possible.

3. Decision Making Authority

Under the NWCF, all shipyard operations are directly linked to the funding they receive for customer orders. All operating expenses are covered with these funds, and for this reason maintenance priorities are heavily influenced by the availability of funds, whether from the Fleet or from NAVSEA. MF shipyards, since they receive their operating budget from Congress, are out from under the requirement to perform the work that has been paid for by individual customers and the burdens associated with shifting priorities, administrative and financial. The Navy feels this organizational structure puts maintenance decisions fully in the hands of the Fleet Commanders instead of Fleet support activities (NAVSEA). In this way, the Navy is better able to perform its overall mission (CBO 2006, p.9). It has been pointed out that unscheduled, emergent availabilities have occurred and been successfully accomplished when all shipyards were under the NWCF, and that quantitatively proving this increased responsiveness would be extremely difficult (CBO 2005, p.14).

Even without being tied to individual customer orders, MF shipyards are not completely free from making maintenance decisions based on financial realities. When preparing their operating budgets, MF shipyards spread their costs between the OMN work they plan to perform for the Fleet and the lower priority modifications and overhauls requested by NAVSEA, for which they are reimbursed separately. If the shipyard expected to receive 25% of their required funds from NAVSEA reimbursable maintenance work, it would budget only for the remaining 75% to be allotted from the Fleet. When executing its mission, the Fleet would maintain authority over which work is

performed and the priorities therein, but only to the point at which its 75% funding runs out. At some point the shipyard must perform the reimbursable work to cover its annual costs, regardless of what priority that maintenance represents (COMSUBPAC Official Interview).

D. ANALYSIS OF COST VISIBILITY

The NWCF is seen as advantageous by DoD because it creates a customer/provider relationship, uses private business techniques to identify total cost and provides managers with improved cost and performance data for more effective and efficient decision making (OSD Comptroller iCenter). There are several reasons, however, why it is difficult to operate a Navy shipyard in a private sector manner.

1. Customer/ Provider Relationship

The benefit of a buyer/ seller relationship is the perceived pressure the customer places on a business. If the service provided is not of good quality or is seen as too expensive, the customer will buy the service elsewhere and the seller will suffer. This provides a continual incentive for businesses to innovate and to operate efficiently and effectively in order to provide a service which the customer sees as a value compared to competitors. This does not exist in a shipyard environment. The lack of competition, due to the shrinking of the U.S. shipbuilding industry, regulations regarding where certain maintenance can be performed and the obvious convenience of performing maintenance at the nearest shipyard (and cost of traveling elsewhere), has resulted in little, if any, incentive to reduce the cost of operations (Trunkey and Choi 1996). There is certainly incentive for NWCF organizations to account for their total cost of operations, since their operations rely on positive cash flow, and negative annual NORs receive significant scrutiny. A lack of consumer pressure, however, is evident in the fact that one year's operating loss can be immediately applied to the following year's DLH rate, absorbed entirely by the customer. Imagine the General Motors' sales figures if they attempted to write last year's losses into the price of their new automobiles. Navy shipyards and the Fleet that utilizes them are not providers and customers in the traditional sense. They are two executive organizations that carry out congress policy.

2. Private Business Practices

a. *Cost Accounting*

Activity Based Costing (ABC) is the term often used to describe the method used by the NWCF to determine the true cost of its service and ensure full cost recovery. The goal of ABC is to correctly assign every cost an organization incurs to the proper product or service that caused that expense. It is useful in focusing an organization on the profitability of each individual product or service provided rather than only being able to judge an organization on its profitability as a whole. It can aid in pricing and is a tool for determining the strategic direction a company should take (Garrison and Noreen 2003, p.314).

The depot level activities under the NWCF identify the process of determining the DLH to charge as being ABC, but when the costs of every service and maintenance item the shipyard produces are all lumped together and divided by the number of hours worked, all that is achieved is an average price. This does not determine the true cost of each of these services; nor does it correctly allocate the shipyard's expenses to the services that incur them. This system provides managers no more information to make performance and cost decisions than is available from mission funding budget justification materials. True ABC would determine the cost of each individual process performed by the shipyard. The cost incurred by the shipyard to perform preservative maintenance on a ship is not anywhere close to the cost of performing seawater system maintenance on submarine hull penetrations. Being able to distinguish these two services and make decisions about which to exploit or to stop providing, and to attack specific inefficiencies are what can make ABC a very useful tool. When every DLH is essentially assigned the same price, these tools are not available to shipyard managers. Every ship's maintenance availability is unique in job size and work performed, so it becomes very difficult to find the inefficiencies from this one variable (DLH), particularly when a DLH consists of an aggregate of all costs.

Also important to understand is, even when inefficiencies are discovered, shipyard managers do not necessarily have the authority to reduce overhead or

manpower, to stop providing services that lose money, or to affect change in many of the costs their commands incur (Trunkey and Choi 1996). The variables that a shipyard manager does have control over are the personnel and resource utilization and other variable costs, which are readily available under mission funding. The GAO cited this fact when it noted that, although the mission funding system did not account for the cost incurred by separate appropriations (which had been previously tracked under the NWCF), it did not directly affect the shipyard commander's ability to manage the maintenance (GAO 2001, p.31).

b. Depreciation Expense

Under the NWCF, all capital expenditures exceeding \$100,000 (except for major construction items) and having a useful life of greater than two years are approved through the NWCF Capital Budget. These costs are then counted as assets and become a depreciation expense charged to the customer throughout their useful life. (DoD FMR 2004, Vol. 2B p.9-4) Conversely, for MF organizations, the threshold is \$250,000, above which any capital expense is funded by the appropriate procurement account for that expense (DoD FMR 2004, Vol. 2A p.1-12).

The NWCF method conforms more closely to that of a typical private business. Including the costs of sustaining the infrastructure necessary to carry out the services a shipyard provides displays the *true cost* to its customers. However, in the same way as when personnel and other fixed costs are funded through other appropriations, capital expenditures paid by procurement funds improve the financial flexibility of the Fleet when priorities and maintenance levels change.

3. Cost Visibility for Senior Officials

When a lack of cost visibility is cited as a being a negative aspect of MF, rather than criticizing the performance capability of a shipyard under mission funding, the concern has been with the cost *reporting* visibility available to senior Navy, OSD and Congressional officials (GAO 1999, p.21/ GAO 2001, p.31/ DoD IG 2005, p.8/ CBO 2006, p.1). Under the NWCF, the Navy produced a quarterly and annual Financial

Statement detailing all costs, revenues and operating information for each individual shipyard. Additionally, the NWCF has a separate section within the Navy BES which outlines shipyard cost and performance information for each shipyard. While both reports are also published for mission funded appropriations, the information is spread amongst the separate appropriations that fund them and thus is not as readily available when examining an individual shipyard. Again, this is of no effect to the operational and decision making ability of the shipyard manager. It only changes the format of the reports created for reviewing authority to the standard format of all other MF activities. The decrease in cost visibility cited in the previous reports has been in regard to the difficulty in pulling the information previously used to report the total cost of a shipyard under the NWCF, all of which was controlled by the shipyard, from the various budget activities that now control the funding of personnel, capital expenditures, etc. These activities collect and track information in ways very different from the NWCF, which can make some shipyard specific information difficult to obtain.

VI. CONCLUSIONS

To better utilize its resources and more effectively provide Fleet maintenance, the Navy significantly changed its shipyard maintenance organizational model. As part of this restructuring, it became clear that a common funding method was necessary at its regional maintenance activities if the full benefits of consolidation were to be achieved. Significant work has been done to analyze the outcome of the Navy's consolidation efforts, but this thesis sought to independently examine the merits of mission funding and the Navy Working Capital Fund, as they apply to Navy shipyards. To do this, this thesis laid aside the cost, productivity and worker utilization metrics that have been influenced by factors other than funding method, and analyzed the implicit differences between the two funding structures within the shipyard environment. The areas examined were those of cost visibility and of operational and financial flexibility.

A. COST VISIBILITY

In the area of cost visibility, the operational capability of Navy shipyards has not suffered from the change to a MF structure. The necessary information required to make managerial decisions that optimize a shipyard's resources is available to the shipyard commander. Indeed, if it could be shown that MF handicaps managerial effectiveness, then an entire revamping of the appropriations process would be warranted to ensure proper cost accountability. Shipyards are able to track their performance and costs in the same manner as any other appropriated functions; and the personnel, overhead and other costs incurred by shipyards, but funded through other organizations, can also be effectively tracked by the commands who manage them.

1. Cost Reporting

The cost visibility problems the Navy has encountered have been in reporting total costs to senior Navy, OSD and Congressional officials in the same manner as was previously reported under the NWCF (even though the shipyards are no longer responsible for the governance of many of these costs). Since this problem does not affect

the shipyard operations, it should not be viewed as a disadvantage of MF compared to the NWCF, but as an administrative reporting problem to be rectified with changes to future reports. This correction was formally requested by Congress in the FY 2006 National Defense Authorization Act (Section 322) and the Navy has responded with a recommendation of the following changes to their budget justification materials:

- Modifications to the Ship Depot Maintenance exhibit that track workload by individual shipyard and specific ships.
- A new comprehensive budget exhibit entitled *Naval Shipyards*.
- Modification of performance data to include the comparison of individual shipyards.
- A new procurement line item entitled *Shipyard Capital Investment*. (CBO 2006, p.12)

Additionally the Navy has proposed changes to its Annual Budget Management Report to better match the data previously available under the NWCF, including:

- The sum of the obligation authority provided from all appropriation accounts used to support Navy shipyards.
- All shipyard costs consolidated into one exhibit.
- Information related to capital expenditures and military construction.
- Personnel and labor management performance data (Ibid, p.16-17).

These changes should provide for satisfactory analysis of the operational effectiveness of each individual shipyard, and allow officials to compare shipyard data in a manner similar to that under the NWCF, effectively neutralizing any perceived advantages the NWCF maintained in cost reporting quality.

2. Business Practices

The NWCF provides no clear advantage in terms of a shipyard commander's ability to effectively and efficiently manage his assets. The cost accounting tools utilized do not advance the available financial data beyond that of mission funding performance and budget reports, and the customer/ provider relationship touted as a being a driver for continual cost and quality improvement is artificial at best. Shipyards do not serve the Fleet in the way a private sector company serves its customers. It may be said that the truest customers a shipyard serves are the Navy, DoD and Congress, which prepare budgets and allocate resources to determine the amount of maintenance the Fleet will conduct, and in this way purchase National Defense. Shipyards and the Fleet work together to maximize the use of these appropriations for Fleet maintenance under either funding method, but in a public setting, it seems that the most performance pressure a shipyard would face is when it is placed under the authority of the Fleet it serves. The nature of this relationship drives cost improvements and efficiency when the shipyard must compete with other programs (during the budget formulation process) for its portion of the Fleet's limited resources.

B. OPERATIONAL AND FINANCIAL FLEXIBILITY

1. Operational Flexibility

Due to the fact that most of the fixed costs associated with shipyard operations are separately funded, mission funded shipyards have more financial flexibility when schedule changes and emergent operations occur. These fixed costs, the costs that occur annually, independent of the amount of maintenance performed, have already been covered. Therefore, the cost to the Fleet to purchase additional maintenance consists only of the incremental costs (the costs that are incurred because of the additional maintenance) of the maintenance requested. Under the NWCF, fixed and variable costs are both rolled into the DLH rate, the average rated required to recover all costs based on the estimated number of billable hours the shipyard expects to work. Once this amount of maintenance has been reached, all costs have been covered, and if additional maintenance

is requested, the only real cost is the variable costs associated with performing the maintenance. However, the rate charged is still the original DLH rate. In this way, the NWCF overcharges for maintenance performed above the level required to cover its fixed costs, and prevents the Fleet from employing any excess shipyard capacity to the maximum extent of its funding. Additionally, the worker tracking requirements of the NWCF, to ensure proper cost recovery, hinder the shipyard commander's ability to reassign workers. These administrative financial accounting burdens disappear under MF, further improving operational flexibility.

A negative aspect of this flexibility is that the ability to freely move workers has come at the cost of effectively tracking personnel overcapacity. However, shipyard commanders have little control over the manning strength of their activities, so it is not a cost that can be managed on their level, but at the level of those who determine manning requirements. Also, Congress and DoD have deemed it a necessary National security investment to maintain excess shipyard capacity, to accommodate surge requirements (U.S. Code Title 10, sec. 2464). It seems appropriate to allow those who operate the shipyards the freedom to utilize this capacity as is seen fit rather than idling personnel resources (in excess labor shops).

2. Financial Flexibility

NWCF shipyards, in and of themselves, maintain significant financial freedom compared to MF. They are bound by none of the fiscal year requirements MF organizations must adhere to, and face no spending uncertainty during appropriations delays. The caveat to this is that, since the only activities that utilize Navy shipyards are MF, in order for any funds to reach the shipyards, they must first have met the regulations from which the NWCF is supposedly free. Funding gaps prevent the Fleet from purchasing maintenance shipyards could legally continue to provide.

Financial flexibility does exist for NWCF shipyards when the costs of services vary, but even this is minimal. Although shipyards under the NWCF are permitted to carry a negative NOR, thus allowing the Fleet to temporarily purchase more maintenance than it can really afford, the statutory limit on this is \$10 million, over which cost

differences must be recouped during the current fiscal year. This amount of leeway is not enough to prevent a reprogramming of funds or the possibility of a supplemental appropriation request in the event of a large unexpected Fleet maintenance requirement, therefore the NWCF should not be seen as being more than minimally advantageous to MF in terms of financial flexibility.

C. FINAL RESULTS

Solid metrics to explicitly verify one funding method over another will probably never be available. The many variables that exist make it extremely difficult to effectively isolate the effects of funding method alone. Additionally, the differences in work from one maintenance job to the next, along with ever changing Fleet readiness requirements, muddle the picture even more. Furthermore, funding changes alone do not produce results. Results stem only from management's use of available information and the ability to overcome the restrictions under which it is placed. To truly measure the effects of the NWCF to MF, the same manager would have to operate the same shipyard with the exact same maintenance requirements over a considerable period of time under each funding method, which is clearly impractical and essentially impossible. While a less stringent model could possibly provide an indication of the effects of a funding change, the significant shipyard structural changes and maintenance requirement changes that have coincided the funding shifts at Pearl Harbor and Puget Sound have prevented this possibility.

Rather than looking at specific performance metrics (see p.55-56), this thesis approached the question of which funding method best supports a Navy shipyard by examining the funding structure differences between both methods and evaluating how these differences provide exploitable opportunities for shipyard managers. Based on this analysis, the mission funded environment provides clear operational advantages with little, if any, financial capability drawbacks. This thesis supports the further implementation of mission funding for the two remaining public shipyards (Norfolk, Va. and Portsmouth, Me.) as is currently scheduled.

D. RECOMMENDATIONS FOR FURTHER STUDY

This thesis has identified structural differences between the NWCF and MF that affect how organizational managers utilize their resources. Several options exist for continued study in this area.

1. Naval Aviation Depots

The maintenance organization used to conduct aviation maintenance for the Navy is very similar to that of a shipyard. However, there has been little discussion regarding a shift from the NWCF to MF for these depots. An examination of whether any differences between shipyards and aviation depots exist that could make the NWCF advantageous for the aviation community, or if a push toward MF at aviation depots would be beneficial is a topic to be considered.

2. East Coast Shipyard Funding Shifts

The Norfolk Naval Shipyard and Portsmouth Naval Shipyard will be shifted to a MF environment beginning in FY 2007. These two shipyards could provide a better opportunity to examine the performance effects of a funding shift. The radical changes to shipyard organization have already taken place, so year to year changes should be less dynamic, allowing for better isolation of funding change effects.

3. One Shipyard

Once the funding shifts at the final two shipyards takes place, it will allow for full implementation of the *One Shipyard* maintenance concept. A future study of the benefits achieved by this platform as well as possibilities for further alignment amongst the Navy's four shipyards could be extremely beneficial.

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